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| EXAMINER |
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ELVE, MARIA ALEXANDRA

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3742

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03/31/2010

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |                                          |  |
|------------------------------|--------------------------------------|------------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/524,982 | <b>Applicant(s)</b><br>BRZESOWSKY ET AL. |  |
|                              | <b>Examiner</b><br>M. Alexandra Elve | <b>Art Unit</b><br>3742                  |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 04 January 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 13-20 is/are rejected.
- 7) ☒ Claim(s) 12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 February 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |                                                                                                            |                                                                                         |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                        | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____                                                |

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4, 6, 8, 10-11, 13-15, 17 & 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nam et al. (USPAP 2002/0046997 A1) in view of Hoekstra et al. (USPN 6,211,488) and Bookbinder et al. (USPN 6,673,752).

Nam et al. discloses a laser beam which heats the non-metal material such that a scribe line is formed. A crack is formed on the surface of the glass; the crack having a predetermined depth and thereby forming a scribe line. A cooling fluid is applied on the cutting route. The cooling fluid may be cooling water or lower temperature cooling gas such as lower temperature inert gas including liquid helium, nitrogen and argon. Following the cooling another laser beam heats the scribe line, yielding high tensile forces which cause the glass to be fully cut.

Although Nam et al. teaches a second laser beam which generates tensile forces, an actual physical force is not specifically taught.

Hoekstra et al. discloses:

A focal point of the laser beam starts at the end of the substrate. The laser beam heats up the substrate.

Art Unit: 3742

...method for physically separating non-metallic substrates forms a microcrack in the substrate and controllingly propagates the microcrack... pulsed laser scribing device forms a microcrack in the substrate... A scribe beam is applied onto the substrate on a separation line. A coolant stream intersects with, or is adjacent to, the trailing edge of the scribe beam. (abstract)

One preferred application for this ... method is for separating glass substrates. However, this apparatus and method may be useful for dividing other types of non-metallic brittle substrates such as quartz, quartz glass, ceramics, silicon, sapphire, and various other electronic and optical materials. (col. 4, lines 20-25)

As shown in FIGS. 3 and 5, the beam producing and quenching device 26 produces a scribe beam 42, a quenching stream 44 of gas and/or fluid, and breaking beams 46 and 48. The splitting device 20 is moved relative to the table 10 and substrate 4 so (a) the scribe beam 42 heats the substrate 4, from the initial microcrack formed by the scribe initiation device 24, along the separation line 45, (b) the quenching stream 44 removes the heat from the substrate 4 along the separation line 45, hereby thermally shocking the substrate 4 in that region and propagating the microcrack along the separation line 45, and (c) the break beams 46 and 48 heat the regions on both sides of the microcrack to create tensile forces to that are sufficient to separate the substrate 4 along the separation line 45 from the microcrack to the bottom surface. (col. 6, lines 35-50)

For example, break beams 46 and 48 in this configuration can help control the onset of tensile forces during the breaks step. (col. 8, lines 55-57)

The quenching stream 44 removes energy or "cools" the substrate heated by the scribe beam 42. (col. 9, lines 59-61)

In a preferred embodiment, the quenching stream 44 is a stream of helium gas. Accordingly, the source 104 contains pressurized helium gas. Helium gas is desirable because it has a high heat capacity and is thus efficient at removing the heat from the substrate 4. Other types of pressurized gas such as nitrogen, CO.sub.2 and argon may also be used. Pressurized air may also

Art Unit: 3742

be used. As an alternative to using pressurized gas only, a mixture of pressurized gas and water may be supplied to a valve from separate sources and discharged together through the nozzle 102. (col. 10, lines 12-22)

If desired, a mechanical force applicator can be used to apply a bending moment to the substrate 4 about an axis defined by the separation line 45. This creates an induced mechanical strain field and facilitates the breaking process. As the substrate should preferably separate into distinct pieces upon the completion of a single pass of the splitting device, use of a mechanical force applicator can help achieve single pass separation. A mechanical force applicator may be preferred if the substrate 4 to be separated is large. (col. 10, lines 50-58)

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the mechanical force applicator, as taught by Hoekstra et al. in the Nam et al. process because it is merely an alternate method of applying a force to the substrate.

Nam et al. and Hoekstra et al. do not teach a surfactant (cationic, nonionic or anionic) or the surfactant concentration.

Bookbinder et al. discloses:

...invention relates to organic cutting fluids that can facilitate the abrading, cutting or machining of vitreous, crystalline, or aggregate materials... (col. 1, lines 13-15)

...a cutting fluid can also function as a coolant for the cutting or grinding tool. (col. 1, lines 37-39)

...cutting fluids used to date have fallen into four general categories of... surfactant solutions... The cutting fluid formulations in the first three categories, which require

Art Unit: 3742

surfactants, traditionally use anionic or non-ionic surface-active agents for reducing surface tension, supplying lubricity and emulsifying oil content. The cationic fluids found in the fourth general category...  
(col. 1, lines 40-54)

A cutting fluid applicable for the machining of vitreous, crystalline or aggregate materials such as glass, glass-ceramics, ceramics, stone, concrete, silicon and the like. The cutting fluid comprises a solution... (abstract)  
The cutting and grinding wheels are used typically for cutting or finishing workpieces, such as a planar sheet of glass or silicon wafer, or molded shapes of glass-ceramics, Corian.RTM. by DuPont or even stone such as granite, marble, or limestone. (col. 8, lines 50-54)

The cutting fluid is prepared with commercially available organic molecules in a detergent suspension to about a 10% weight concentration in water, and diluted to about 0.1-1.0% when used. (col. 7, lines 25-28)

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the surfactants (cationic, nonionic or anionic) and the surfactant concentration (0.1 to 1.0%) as taught by Bookbinder et al. in the Nam et al. and Hoekstra et al. process because coolants and cutting fluids function as one and the same (i.e. interchangeable). Furthermore, Bookbinder et al., Nam et al. and Hoekstra et al. are directed to the machining of brittle materials.

The exact amounts of each of the constituents as presently claimed are not disclosed in the prior art, however, the prior art compositions closely approximate or overlap applicant's claimed composition. It has been held that one of ordinary skill in the art at the time of the invention would have considered the claimed compositions to

Art Unit: 3742

have been obvious because close approximation or overlapping ranges in a composition is considered to establish a prima facie case of obviousness. See *In re Malagari*, 182 USPQ 549, *Titanium Metals v. Banner* 227 USPQ 773, *In re Nehrenberg* 126 USPQ 383.

Claims 5, 7, 9, 16, 18 & 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Nam et al.*, *Hoekstra et al.* and *Bookbinder et al.*, as stated above and further in view of *Iwata et al.* (USPN 5,565,363).

*Nam et al.* discloses cooling water or lower temperature cooling gas such as lower temperature inert gas including liquid helium, nitrogen and argon. While *Hoekstra et al.* discloses an aqueous/gas mixture coolant and *Bookbinder et al.* teaches surfactants (cationic, nonionic or anionic) with surfactant concentrations ranging from 0.1 to 1.0%. Examples of surfactant of instant claims are not taught.

*Iwata et al.* discloses

Examples of the surfactant are anionic surfactants, cationic surfactants, amphoteric surfactant, and nonionic surfactants. (col. 4, lines 57-58)

Examples of **anionic** surfactants are higher alcohol sulfonates or sulfates, e.g. sodium dodecylsulfate (SDS), lithium dodecylsulfate, sodium dodecylbenzenesulfonate **(SDBS)**, sodium 1-dodecanesulfonate, sodium diisooctylsulfosuccinate (SDOSS), sodium octylsulfate, etc. (col. 4, lines 59-63)

Art Unit: 3742

Note SDBS is dodecylbenzene sulfonic acid sodium salt (chemical registry # 25155-30-0).

Examples of **cationic** surfactants are quaternary ammonium salts containing one or more alkyl groups having 7 or more carbon atoms, usually 30 or less carbon atoms, for example, myristyltrimethylammonium bromide (MTAB), cetyltrimethylammonium bromide (CTAB), octadecyltrimethylammonium chloride, dodecyltrimethylammonium chloride, cetyltrimethylammonium chloride, lauryltrimethylammonium chloride, etc.; quaternary ammonium salts having a phenyl group such as benzalconium chloride, tetradecyldimethylbenzylammonium chloride, octadecyldimethylbenzylammonium chloride, lauryldimethylbenzylammonium chloride, etc.; quaternary ammonium salts having a pyridyl group such as laurylpyridinium chloride, cetylpyridinium chloride stearylamidomethylpyridinium chloride etc. (col. 4, lines 66-67 & col. 5, lines 1-13)

Note CTAB is cetyl trimethyl ammonium bromide (chemical registry # 57-09-0).

Examples of nonionic surfactants are polyoxyethylene alkyl phenyl ethers such as polyoxyethylene (8) octyl phenyl ether, polyoxyethylene (10) octyl phenyl ether, etc; polyoxyethylene alkyl esters such as polyoxyethylene (20) sorbitane monolaurate, polyoxyethylene sorbitane monooleate, polyoxyethylene sorbitane monopalmitate, polyoxyethylene sorbitane monostearate, polyoxyethylene sorbitane trioleate, etc.

Note octadecyl deca(ethylenoxide) hydroxide (appears to have registry # 13149-86-5).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the surfactants as disclosed by Iwata et al. in the Nam et al., Hoekstra et al. and Bookbinder et al. process because these are merely specific examples of surfactants; the presence of which are required by Nam et al., Hoekstra et al. and



Art Unit: 3742

Bookbinder et al. The types of materials chosen are a choice in design and substitutions of known equivalent structures may be used. In re Kuhle 188 USPQ (CCPA 1975), In re Ruff 118 USPQ 343 (CCPA 1958).

### ***Allowable Subject Matter***

The following is a statement of reasons for the indication of allowable subject matter: The prior art does not teach breaking a brittle material with a laser and coolant that is an aqueous surfactant solution which bonds to the broken siloxane bonds in the microcrack.

Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Response to Arguments***

Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See US PTO-892

Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Alexandra Elve whose telephone number is 571-272-1173. The examiner can normally be reached on 7:30-4:00 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tu B. Hoang can be reached on 571-272-4780. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

March 28, 2010.

/M. Alexandra Elve/  
Primary Examiner, Art Unit 3742

./TU B HOANG/  
Supervisory Patent Examiner, Art Unit 3742